JAMIA HAMDARD

(DEEMED TO BE UNIVERSITY)

Accredited by NAAC in 'A' Category

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HAMDARD NAGAR
NEW DELHI – 110062

(Request for Proposal)

(Introduction)

Jamia Hamdard a Deemed to be University invites proposals from the eligible bidders for supply, installation and commissioning of Active and passive networking components for its recently renovated state of the art Central IT facility **'Hakeem Abdul Hameed Centre for Information Technology' (HAH-CIT)** named after the Founder of the University **'*Late* Padma Bhushan Hakeem Janab Abdul Hameed'**, a renowned Unani practitioner of his time and a great Institution Builder.

The HAH-CIT has been catering to the IT requirement of the University since its establishment in 1997.Now after the renovation, 03 state of the art UG Labs, 01 PG Lab and a Research Lab has been created for students, research scholars and faculty members of the University along with sitting spaces for the technical staff of the Centre and an in-house TRC.

Now for these labs and other utilities of the Centre where cables and user side IOs have already been laid, a RFP for Active components like Switches, Access points and some passive components like Racks, patch cords etc.is solicited from eligible vendors.

Therefore, Sealed bids in two bids system (Two separate bids one for technical and other for financial in two separate envelopes) are invited from the Cisco or Aruba (HP) or their authorized representatives for supply, installation, Commissioning of networking (both Active & Passive) equipment & services as per the table of Schedule given below.

Sr.No	Activity	Date
1.	Issue of the Tender Document	From 29.05.2024 to 06.06.2024
2.	Receipt of Queries	Up to 07.06.2024 by 3.30:00 PM (Queries after above date will not be entertained under any circumstance) Only on Mail (**HAH-CIT@jamiahamdard.ac.in**)
3.	Pre bid meeting	On 11.06.2024 at 11 A.M HNF Board Room, Admin Building, Jamia Hamdard, Hamdard Nagar, New Delhi -110062
4.	Response to Queries	14.06.2024 on Jamia Hamdard Website
5.	Receipt of Bids	Up to 21 st June at HAH-CIT,1st Floor Central library Building, Jamia Hamdard, Nagar, New Delhi-110062

Scope of the Work:

Supply, Installation and Commissioning of Active & Passive Components at HAH-CIT, JH. Details of specifications given as Annexure 'A' for Active Components and for passive components at Annexure 'B'

Tender Fee & EMD

A nonrefundable tender fee of Rs.3000 and an EMD of Rs.90, 000 favoring 'Jamia Hamdard' will have to be deposited by the bidders in the form of a DD.

Eligibility Criteria:

1. The bidder must attach a Manufacturer Authorization Form (MAF) form from any of the two OEMs namely Cisco & Aruba (HP) and addressed to The Registrar, Jamia Hamdard. The bids received without MAF shall be out rightly rejected.

2. The Bidder mush have a minimum average turnover of Rs. 15 Cr in the last three financial year from IT related System Integrations preferably networking related activities.

3. The bidder must attach a certificate of incorporation and certified copy of balance sheet from a CA for the previous three financial years.

4. The bidder must have ISO 9001 certificate.

5. The bidder must have executed the similar work in any State / Central Govt Department / Govt Agencies / PSU in last three financial year.

6. The bidder must attach the PO & Completion Certificate copy of the work completed.

7. The bidder must attach at least one successful implemented project of minimum Rs. 80L or more in supply, installation and commissioning of Active and Passive components. PO and Completion Certificate of such work has to be furnished along with the technical bid.

8. All pages of the Bids shall be numbered. For illustration if the bid has 15 pages in total the first page should be numbered like 1/15, second page like 2/15 and so on and each page should be duly signed & stamped from an authorized/competent person of the bidding firm.

9. **The successful tenderer will have to deposit 5% of the total value of supply as Security Money in the form of Performance Bank Guarantee or FDR in favour of the Registrar, Jamia Hamdard, New Delhi; which will be refunded after completion of the warranty period and will be adjusted in case of violation of terms and conditions laid down above.**

10. The bids should be made in two bid pattern, i.e. in Technical Bid and Price Bid in separate envelopes. Both the envelopes should be supersribed with tender enquiry details and clearly marked as "Technical Bid" & "Price Bid". Envelopes then should be sealed inside a single envelope that should be duly superscribed as "Tender for Active & Passive work of HAH-CIT,Jamia Hamdard" and addressed to the Secretary, HNF-HECA, Information Technology Committee,HAH_CIT,1st floor Central Library Building, **Jamia Hamdard,New Delhi-62**.

Specifications:
Detailed specifications for Active Components with BoQ is attached here with on Annexure 'A' and and and

General terms & Conditions:

11. The bidder will provide user manual to end-user detailing operations of the equipment and onsite user level training at the time of installation.

12. The bidder will submit a detailed implementation plan after consultation with HAH-CIT/JH within one week from the date of purchase order.

13. The bidder shall deliver and implement the technologies in conjunction with a set of best practices guidelines & industry standards.

14. The Bidder has to ensure that during the execution of the project they do not damage or disrupt the existing services under and above the ground.

15. The bidder will provide user manual to end-user detailing operations of the equipment and onsite user level training at the time of installation.

16. The methodology of conduiting & cabling and installation work, to be adopted, has to ensure minimum damage to the existing finish and no loss to the aesthetic beauty of the floors & Walls. Any damage to the existing flooring / walls etc. shall be made good by the bidder.

17. Documentation of all final configurations done on active components shall be prepared and shared by the bidder in soft as well in hard format.

18. The bidder will ensure the availability of services from professionally qualified team during implementation of the project and to provide the required on-site warranty & maintenance for a during warranty period.

19. It may specifically be mentioned whether the Bid is strictly as per tender specifications/conditions. If not, deviations must be spelt out specifically. In the absence of this, the quotation may be rejected. Deviation on lower side of specifications will not be considered. No deviations in terms & conditions of the tender document will be accepted in any case.\

Delivery of Goods:

Strictly within 08 weeks of issue of Work Order and installations in another 02 weeks complete in all respects including documentations.

Annexure 'A'

S.No	Specification for Core Switch)	Compliance Yes/No
A	**Model:**	
B	**Make:**	
(1)	**Architecture**	
i	Shall be 19" Rack Mountable	
ii	The switch should support two field-replaceable and hot- swappable power supply loaded from day one. The switch should have 1x USB-C Console Port , 1x OOBM and 1x USB Type A Host port	
iii	8GB DDR4 and 32GB eMMC and 8 MB Packet buffer size	
iv	The switch should support front plane stacking on uplink port or Backplane stacking and should have Stacking Performance of minimum 200 Gbps. The switch should suppot minimum 8 switch in stack	
v	The Switch should support min 32000 MAC address	
vi	The switch should have minimum 61,000 Ipv4 Unicast Routes ,61000 Ipv6 Unicast Routes ,8K Ipv4 Multicast Routes,8K Ipv6 Multicast Routes,8K Igmp Groups ,8K Mld Groups 4,000 ,Ipv4/Ipv6/MAC ACL Entries (Ingress) 5000/1250/5000 and Ipv4/Ipv6/MAC ACL Entries (Egress) 2000/500/2000	
vii	The switch should support Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all 10/100/1000 ports.	
(2)	**Switch -Option**	
i	**The should have 24x ports 1/10G SFP+ ports and 4x 1/10/25/50G SFP ports**	
ii	The switch should have min 880 Gbps of Switching Capacity and min 654 Mpps Throughput Capacity	
(3)	**IPv6 feature**	
I	IPv6 host enables switches to be managed in an IPv6 network	
II	Dual stack (IPv4 and IPv6) transitions from IPv4 to IPv6, supporting connectivity for both protocols	
III	MLD snooping forwards IPv6 multicast traffic to the appropriate interface	
IV	IPv6 ACL/QoS supports ACL and QoS for IPv6 network traffic	
V	IPv6 routing supports Static and OSPFv3 protocols	
VI	RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping	
4	**High Availability And Resiliency**	
I	The swith should support front plane stacking on uplink port or Backplane stacking and should have Stacking Performance of minimum 200 Gbps. The switch should suppot minimum 8 switch in stack	
II	The Switch should have Hot Swappable Power Supplies	
III	The Switch should support Bidirectional Forward Detection (BFD) to enable sub-second failure detection for rapid routing protocol re-balancing	
IV	The Switch should support Virtual Router Redundancy Protocol (VRRP) to allow groups of two routers to dynamically create highly available routed environments in IPV4 and IPV6 networks	
V	The Switch should support Uni-directional Link Detection (UDLD) to monitor link connectivity and shut down ports at both ends if uni- directional traffic is detected, preventing loops in STP- based networks	
VI	The Switch should support IEEE 802.3ad LACP supports up to 256 LAGs, each with up to 8 links per LAG and provide support for static or dynamic groups and a user-selectable hashing algorithm	

VII	The Switch should support IEEE 802.1s Multiple Spanning Tree provides high link availability in VLAN environments where multiple spanning trees are required and legacy support for IEEE 802.1d and IEEE 802.1w	
VIII	The Switch should support IEEE 802.3ad link-aggregation-control protocol (LACP) and port trunking supports static and dynamic trunks where each trunk supports up to eight links (ports) per static trunk	
(5)	**Management**	
I	The Switch should support Built-in programmable and easy to use REST API interface	
II	The Switch should support On-premises and cloud- based management	
III	The Switch should support Zero-Touch Provisioning (ZTP) simplifies installation of switching infrastructure using DHCP-based	
IV	The Switch should have Scalable ASIC-based wire speed network monitoring and accounting with no impact on network performance.	
V	The Switch should support Industry-standard CLI with a hierarchical structure	
VI	The Switch should support Management security restricts access to critical configuration commands, provides multiple privilege levels with password protection, and local and remote syslog capabilities allow logging of all access	
VII	The Switch should support SNMP v2c/v3 provides SNMP read and trap support of industry standard Management Information Base (MIB), and private extensions sFlow (RFC 3176)	
VIII	The Switch should support Remote monitoring (RMON) with standard SNMP to monitor essential network functions. Supports events, alarms, history, and statistics groups as well as a private alarm extension group; RMON, XRMON, and sFlow provide advanced monitoring and reporting capabilities for statistics, history, alarms and events	
IX	The Switch should support TFTP and SFTP support offers different mechanisms for configuration updates;	
X	The Switch should support Debug and sampler utility support ping and traceroute for IPv4 and IPv6	
XI	The Switch should support Network Time Protocol (NTP) synchronizes timekeeping among distributed time servers and clients	
XII XIII	The Switch should support IEEE 802.1AB Link Layer Discovery Protocol (LLDP) advertises and receives management information from adjacent devices on a network, facilitating easy mapping by network management applications	
XIV	The Switch should support Dual flash images provides independent primary and secondary operating system files for backup while upgrading	
XV	The Switch should support Assignment of descriptive names to ports for easy identification	
XVI	The Switch should support Multiple configuration files which can be stored to a flash image	
XVII	The Switch should support Ingress and egress port monitoring enable more efficient network problem solving	
XVIII	The Switch should support Unidirectional link detection (UDLD) monitors the link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices	
XIX	The Switch should support Power down mode to deliver energy savings by allowing the switch to power down most of the switch, except a clock which will boot up the switch when scheduled	
XX	The Switch should support IP SLA for Voice monitors quality of voice traffic using the UDP Jitter and UDP Jitter for VoIP tests	
5	**Multicast**	

I	The Switch should support IGMP Snooping to allow multiple VLANs to receive the same IPv4 multicast traffic, lessening network bandwidth demand by reducing multiple streams to each VLAN	
II	The Switch should support Multicast Listener Discovery (MLD) enables discovery of IPv6 multicast listeners; supports MLD v1 and v2	
III	The Switch should support Protocol Independent Multicast (PIM) defines modes of IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information and support PIM Sparse Mode (SM) and Dense Mode (DM) for both IPv4 and IPv6	
IV	The Switch should support Internet Group Management Protocol (IGMP) and Any-Source Multicast (ASM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3	
V	The Switch should support Multicast Service Discovery Protocol (MSDP) to efficiently routes multicast traffic through core networks	
6	**Layer 2 Switching**	
I	The Switch should support VLAN and tagging for IEEE 802.1Q (4094 VLAN IDs)	
II	The Switch should support Jumbo packet to improves the performance of large data transfers and support frame size of up to 9198 bytes	
III	The Switch should support IEEE 802.1v protocol VLANs to isolate select non-IPv4 protocols automatically into their own VLANs	
IV	The Switch should support Rapid Per-VLAN Spanning Tree (RPVST+) to allow each VLAN to build a separate spanning tree to improve link bandwidth usage.	
V	The Switch should support MVRP to allow automatic learning and dynamic assignment of VLANs	
VI	The Switch should support VXLAN encapsulation (tunnelling) protocol for overlay network that enables a more scalable virtual network deployment	
VII	The Switch should support Bridge Protocol Data Unit (BPDU) tunnelling to Transmits STP BPDUs transparently	
VIII	The Switch should support Port mirroring duplicates port traffic (ingress and egress) to a monitoring port; and support minimum 4 mirroring groups	
IX	The Switch should support STP supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)	
X	The Switch should support Internet Group Management Protocol (IGMP) Controls and manages the flooding of multicast packets in a Layer 2 network	
7	**Layer 3 Routing**	
I	The Switch should support Border Gateway Protocol (BGP) provides IPv4 and IPv6 routing.	
II	The Switch should support Equal-Cost Multipath (ECMP) enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth	
III	The Switch should support Multi-protocol BGP (MP-BGP) enables sharing of IPv6 routes using BGP and connections to BGP peers using IPv6	
IV	The Switch should support Open shortest path first (OSPF) delivers faster convergence.	
V	The Switch should support OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing	
VI	The Switch should support Static IP routing provides manually configured routing	
VII	The Switch should support Policy-based routing and usesa classifier to select traffic that can be forwarded based on policy set by the network administrator	
VIII	The Switch should support Static IPv4 and IPv6 routing to provide simple manually configured IPv4 and IPv6 routes	

IX	The Switch should support IP performance optimization to provide a set of tools to improve the performance of IPv4 networks including directed broadcasts, customization of TCP parameters, support of ICMP error packets, and extensive display capabilities	
X	The Switch should support Dual IP stack to maintain separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design	
8	**Convergence**	
I	The Switch should support IP multicast routing includes PIM Sparse and Dense modes to route IP multicast traffic	
II	The Switch should support IP multicast snooping (data-driven IGMP) to prevent flooding of IP multicast traffic	
III	The Switch should support Protocol Independent Multicast for IPv6 and support one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks	
IV	The Switch should support LLDP-MED (Media Endpoint Discovery) to define a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones	
V	The Switch should support multiple method of PoE allocations (allocation by usage or class, with LLDP and LLDP-MED) to allocate PoE power for more efficient power management and energy savings	
VI	The Switch should support Auto VLAN configuration for voice RADIUS VLAN uses a standard RADIUS attribute and LLDP-MED to automatically configure a VLAN for IP phones	
9	**Security**	
I	The Switch should support integrated trusted platform module (TPM) for platform integrity. This ensure the boot process started from a trusted combination of switches.	
II	The Switch should supportAccess control list (ACL) support for both IPv4 and IPv6 to allow for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources. Rules can either deny or permit traffic to be forwarded. rules can be based on a Layer 2 header or a Layer 3 protocol header	
III	The Switch should support ACLs filtering based on the IP field, source/ destination IP address/subnet, and source/ destination TCP/UDP port number on a per-VLAN or per-port basis	
IV	The Switch should support Remote Authentication Dial-In User Service (RADIUS)	
V	The Switch should support Terminal Access Controller Access-Control System (TACACS+) delivers an authentication tool using TCP with encryption of the full authentication request to provide additional security	
VI	The Switch should support Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks	
VII	The Switch should support multiple user authentication methods. Uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards	
VIII	The Switch should support Web-based authentication provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support IEEE 802.1X	
IX	The Switch should support MAC-based client authentication	
X	The Switch should support Concurrent IEEE 802.1X, Web, and MAC authentication schemes per switch port accepts up to 32 sessions of IEEE 802.1X, Web, and MAC authentications	
XI	The Switch should support DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks	
XII	The Switch should support Secure management access delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3	

XIII	The Switch should support Switch CPU protection to provide automatic protection against malicious network traffic trying to shut down the switch	
XIV	The Switch should support ICMP throttling defeats, ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic	
XV	The Switch should support Identity-driven ACL to enable implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user	
XVI	The Switch should support STP BPDU port protection to block Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks	
XVII	The Switch should support Dynamic IP lockdown with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing	
XVIII	The Switch should support Dynamic ARP protection to blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data	
XIX	The Switch should support STP root guard to protects the root bridge from malicious attacks or configuration mistakes	
XX	The Switch should support Port security to allow access only to specified MAC addresses, which can be learned or specified by the administrator	
XXI	The Switch should support MAC address lockout to prevent particular configured MAC addresses from connecting to the network	
XXII	The Switch should support Source-port filtering to allow only specified ports to communicate with each other	
XXIII	The Switch should support Secure shell to encrypt all transmitted data for secure remote CLI access over IP networks	
XIV	The Switch should support Secure Sockets Layer (SSL) to encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch	
XV	The Switch should support Secure FTP to allow secure file transfer to and from the switch and protect against unwanted file downloads or unauthorized copying of a switch configuration file	
XVI	The Switch should support Critical Authentication Role to ensure that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server	
XVII	The Switch should support MAC Pinning to allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected	
XVIII	The Switch should support Management Interface Wizard to help secure management interfaces such as SNMP, telnet/SSH, SSL, Web.	
XIX	The Switch should support Security banner displays a customized security policy when users log in to the switch	
XX	The Switch should support Green initiative for RoHS (EN 50581:2012) and WEEE regulations	
10	**Certification**	
	EN 60950-1, EC 60950-1,EN 61000,EN 60825	

S. No.	Specification for 48 Port Layer-2 Switch Total Quantity 05	Compliance Yes/No
	Technical Specification for Managed Layer -2 Switch (2x10G + 48x 10/100/1000 Mbps Ports)	
A	**Make**	
B	**Model**	
1	**General Requirement**	q
i.	All hardware including switch shall be with 3 years onsite comprehensive warranty with 24x7x365 remote hardware support after successful completion of the entire work commissioning or 42 months from date of delivery at consignee, whichever is earlier. Post installation, 3-years product warranty support should reflect in the web site of the OEM.	
ii	Switch shall have built-in power-on diagnostics system to detect hardware failures.	
iii.	Switch shall have suitable visual indicators for Diagnostics and healthy/unhealthy status of ports and modules.	
iv.	Tenderer should carry out Installation, testing & commissioning as per Principle's (OEM's) Manual (if any) and instruction of site in charge.	
2.	**Hardware Capability:**	
i.	48 RJ-45 autosensing 10/100/1000 ports and 4 SFP+ 1/10GbE ports	
ii.	Switch shall have 48 Nos. 10 Base-T/100 Base-Tx/1000 Base –T auto-sensing ports complying to IEEE802.3, IEEE 802.3u and 802.3ab standard, supporting Half duplex mode, full duplex mode and auto negotiation on each port to optimize bandwidth.	
iii.	Switch shall support Auto MDIX (Media Dependent Interface Cross-over) on all 100 Base –T ports.	
iv.	Switch shall have minimum of 176 Gbps forwarding bandwidth at Layer-2 switching fabric.	
v.	Shall have up to 112 million pps switching throughput	
vi	Switch shall have dedicated ports for stacking/LAG of multiple switches with a minimum of 32Gbps dedicated stacking/LAG bandwidth (in addition to switching bandwidth specified in item number 8 above) or Switch should support virtual stacking	
vii.	The switch hardware shall be designed to run both IPv4 & IPv6 simultaneously (dual stack) from day one.	
viii.	The switching fabric for all the LAN ports Shall be non-blocking and each port shall run at wire speed/line rate.	
ix.	Switch shall have redundant power supply internal/external	
ix.	Switch shall support for 19 inch rack mountings.	
3.	Functional requirements:	
i.	Switch shall support link aggregation control protocol (LACP) as per IEEE802.3ad.	
ii.	Switch shall support 802.1Q VLAN on all ports with support for minimum 255 VLANs.	
iii.	Switch shall support IEEE 802.1Q VLAN tagging on all courts	
iv.	Switch shall support minimum 32K MAC addresses.	
v.	Switch shall support dining tree protocol as per IEEE 802.1d.	
vi.	Switch shall support Multiple Spanning Tree protocol as per IEEE 802.1s.	
vii.	Switch shall support Rapid Spanning Tree protocol as per IEEE 802.1w.	
viii.	Switch shall support Jumbo frames up to 9000 bytes.	
ix.	Switch shall support self-learning of active unicast and multicast MAC addresses and associated VLANs.	
x.	Switch shall support "Port Spanning functionality" for measurements using a network analyzer.	
xi.	Switch shall cell support TFTP/FTP.	
xii.	Switch shall support IGMP snooping V-1, 2 &3.	
xiii.	Switch shall support NTP (Network time protocol) or SNTP (Simple Network Time Protocol) for date and time synchronization from NTP server.	

xiv.	The switch should support basic Static Route and OSPF, Policy based Routing feature	
4.	**Quality of service feature:**	
i.	Switch shall support classification and scheduling as per IEEE 802.1p on all ports.	
ii.	Switch shall support minimum four Hardware queues per port.	
iii.	Switch shall support strict priority queuing.	
5.	Security features:	
i.	Switch shall support per port broadcast, multicast and unicast storm control to prevent the degradation of overall system performance occurred due to faulty end station.	
ii.	Switch shall support for IEEE 802.1x port based authentication with VLAN assignment, port security and ACL (Access Control List) assignment.	
iii.	Switch shall support MAC address based filters/Access Control List (ACLs) on all switch ports.	
iv.	Switch shall support port as well as VLAN based filters/ACLs.	
6.	**Management features:**	
i.	Switch shall have a console port with RS-32 interface or RJ-45 interface for configuration and Diagnostic purposes.	
ii.	Switch shall be SNMP manageable with support for SNMP version 1, 2 and 3.	
iii.	Switch shall support all the standard MIBs (MIB I & II).	
iv.	Switch shall have web based network management software for configuration and Management. In case the management is not supported through general purpose internet browser, the bidder shall provide necessary software/client for web based management of the switch.	
v.	Switch shall support Telnet / SSH version-2 for command line management.	
vi.	Switch shall support four groups of embedded RMON (history, statistics, alarm and events)	
vii.	Switch shall support multiple privilege levels to provide different levels of access on console port and Telnet or SSH sessions.	
viii.	The switch shall support authentication, authorization and accounting through RADIUS/TACACS+.	
ix.	Switch shall support system and event logging functions as well as forwarding of these logs onto a separate server for log management	
x.	Switch shall support on-line software reconfiguration to implement changes without rebooting. Any changes in the configuration of switches related to layer-2 functions, VLAN, STP, Security, QoS shall not require rebooting of the switch.	
xi.	Switch shall have comprehensive debugging features, required for Software and Hardware fault diagnosis.	
xii.	Switch shall support following in the user level of access i.e. the user with minimum privileges :	
	a. Display of input and output error statistics on all interfaces.	
	b. Display of input and output data rate statistics on all interfaces.	
	c. Display of dynamic ARP table.	
	d. Display of MAC-address-table.	
7.	**Regulatory compliance:**	
i.	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 or equivalent Indian standard for safety requirements of Information Technology Equipment.	
ii.	Switch shall conform to EN 55022 class A/B or CISPR22 Class A/B or CE class A/B or FCC class A/B or equivalent Indian standards for EMC (Electro Magnetic Compatibility) requirements.	

Sr. No	Specifications 24 port POE Switch Quantity 03	Compliance Yes / No
A	**Make:**	
B	**Model:**	
1	**Architecture**	
i	Shall be 19" Rack Mountable	
ii	24 RJ-45 autosensing 10/100/1000 PoE+ ports and 4 x1/10GbE ports SFP+ ports	
iii	The switch should have 1 dual-personality (RJ-45 or USB micro-B) serial console port	
iv	The switch should have 1GB SDRAM and 12 MB Packet buffer size	
v	Shall have switching capacity of 128 Gbps or more	
vi	Shall have up to 95 million pps switching throughput	
vii	Switch should support PoE/PoE+ with poE budget 370W	
viii	Switch should support IEEE 802.3at	
Ix	Dedicated stacking port or Switch should support virtual stacking	
x	The Switch should support 32000 MAC address	
2	**Software Defined Networking (SDN) Capability**	
	Open Flow protocol capability to enable software-defined networking	
3	**Features**	
i	The switch should support HTTP redirect function	
ii	The Switch should support Static IP Visibility to do accounting for clients with static IP address	
4	**Quality of Service (QoS)**	
i	The switch should support Traffic prioritization (IEEE 802.1p) to allows real-time traffic classification into eight priority levels mapped to eight queues	
ii	The switch should support Layer 4 prioritization to enable prioritization based on TCP/UDP port numbers	
iii	The switch should support Class of Service (CoS) to sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ	
iv	The switch should support Rate limiting to sets per-port ingress enforced maximums and per-port, per-queue minimums	
v	The switch should Provide graceful congestion management	
5	**IPv6 Feature**	
i	The switch should support IPV6 host to enable switches to be managed in an IPv6 network	
ii	The switch should support Dual stack (IPV4 and IPV6) to transition from IPv4 to IPv6, supporting connectivity for both protocols	
iii	The switch should support MLD snooping to forward IPv6 multicast traffic to the appropriate interface	
iv	The switch should support ACL and QoS for IPv6 network traffic	
6	**Security**	
i	The switch should support Energy-efficient Ethernet (EEE) to reduce power consumption in accordance with IEEE 802.3az	
ii	The switch should support very low latency, increased packet buffering, and adaptive power consumption	
iii	The switch should support inbuilt Trusted Platform Module (TPM) for secure hardware-based generation and storage of cryptographic keys for authentication purposes and OS Protection	
iv	The switch should support Selectable queue configurations	
v	The switch should have facility to allow for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications	
7	**Convergence**	
i	The switch should support IP multicast routing and PIM Sparse and Dense modes to route IP multicast traffic	
ii	The switch should support IP multicast snooping and IGMP	
iii	The switch should support LLDP-MED (Media Endpoint Discovery)	
iv	The switch should support IEEE 802.1AB Link Layer Discovery Protocol (LLDP)	
v	The switch should support Local MAC Authentication	

8	**Resiliency and high availability**	
i	The Switch should create one virtual resilient switch from four switches and attached the network devices using standard LACP for automatic load balancing and high availability to simplify network operation by reduce the need for complex protocols like Spanning Tree Protocol (STP), Equal-Cost Multipath (ECMP), and VRRP	
ii	The switch should support IEEE 802.1s Multiple Spanning Tree	
iii	The switch should support IEEE 802.3ad link-aggregation-control protocol (LACP) and port trunking	
iv	The switch should provide easy-to-configure link redundancy of active and standby links	
9	**Management**	
	The switch should support SNMPv1, v2, and v3	
10	**Manageability**	
i	The switch should support Dual flash images	
ii	The switch should allow assignment of descriptive names to ports	
iii	The switch should allow multiple configuration files to be stored to a flash image	
iv	The switch should support RMON, XRMON, and sFlow	
v	The switch should provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events	
vi	The switch should support ingress and egress port monitoring enable network problem solving	
vii	The switch should support Unidirectional link detection (UDLD)	
11	**Layer 2 switching**	
i	The switch should support IEEE 802.1Q (4094 VLAN IDs) and 2K VLANs simultaneously	
ii	The switch should support Jumbo packet support	
iii	The switch should support IEEE 802.1v protocol VLANs	
iv	The switch should support Rapid Per-VLAN Spanning Tree (RPVST+)	
v	The switch should support GVRP and MVRP	
12	**Layer 3 services**	
	The switch should support DHCP server	
13	**Layer 3 routing**	
i	The switch should support minimum 256 static IP routing	
ii	Routing Information Protocol (RIP)	
iii	The switch should support RIPv1, RIPv2, and RIPng routing and support 10,000 RIP routes	
iv	The switch should support OSPFv2 and OSPFv3 protocols from Day 1	
v	The switch should support Policy-based routing	
14	**Security**	
i	The switch should support IEEE 802.1X, Web-based authentication, MAC-based authentication	
ii	The switch should support Access control lists (ACLs)	
iii	The switch should provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number	
iv	The switch should support Source-port filtering	
v	The switch should support RADIUS/TACACS+ and SSH	
vi	The switch should support Port security	
vii	The switch should support MAC address lockout	
viii	The switch should support STP BPDU port protection	
ix	The switch should support DHCP protection	
x	The switch should support Dynamic ARP protection	
Xi	The switch should support STP root guard	
xii	The switch should support Private VLAN	
15	**Environmental Features**	
i	Shall support IEEE 802.3az Energy-efficient Ethernet (EEE) to reduce power consumption	
ii	Operating temperature of 0°C to 45°C	

	Safety and Emission standards including EN 60950; IEC 60950; VCCI Class A; FCC Class A	
16	**Warranty and Support**	
i	The 5 Year Part Replacement Warranty shall be offered directly from the switch OEM and shall also include Software upgrades/updates shall as part of the warranty	
ii	The Transceivers and Switch shall be from the same OEM	

S.No.	Specification / Requirement	Compliance (Yes/No)
A	**Make:**	
B	**Model:**	
I	The APs should support the IEEE 802/11a/b/g/n/ac/ax with dual radio capabilities conforming to Wi-Fi 6 standard.	
ii	The AP should support 4x4:4 MIMO. It should support minimum 2400 Mbps data rates on 5 GHz and minimum 500 Mbps data rates on 2.4GHz.	
iii	The AP shall have One 2.5 Gbps Ethernet port and one 1Gbps Ethernet port. Additionally, it should support connectivity based on Bluetooth Low Energy (BLE). The AP shall support Link aggregation (LACP) between both network ports for redundancy and increased capacity	
iv	The access points should be cloud managed capacity as well to work as standalone.	
v	The access point should be able to operate in full MIMO mode when necessary power POE/POE+/uPOE is provided.	
vi	Security mechanisms should be in place to protect the communication between the Access Point controller and the Access Points.	
vii	The AP should have dedicated console port for management. The AP should have an option to be powered up through DC power /Power Injector in addition to POE.	
viii	The AP should have a minimum receive sensitivity of -96dBm.	
ix	The AP should provide an antenna gain of minimum 4dBi on 2.4 and 7dbi on 5Hz band.	
x	The AP should support 20, 40, 80, 160 MHz channelization.	
xi	The access point should be able to detect clients that have dual band capability and automatically steer those clients to use the 5GHz band instead of the 2.4GHz band.	
xii	The AP should provide minimum TX Power of 21dBm	
xiii	The access point should support 802.1q VLAN tagging	
xiv	The access point should support WPA-PSK, WPA-TKIP, WPA2 AES, WPA3, 802.11i security.	
xv	The Access Point should provide for concurrent support for high- definition IP Video, Voice and Data application without needing any configuration change.	
xvi	The Access Point should support WMM, Power Save, TX Beam forming, LDPC or equivalent, STBC or equivalent, 802.11r/k/v.	
xvii	The AP should have the capability to support minimum 16 BSSID	
xviii	Should support 500 or more clients per AP.	
xix	Should support IPv6 dual stack from day one	
xx	The Access Point should support rate limiting, application recognition and control, Access Control lists and device fingerprinting or equivalent functionalities.	
xxi	Operating Temperature: 0°C to 50°C. Operating Humidity: up to 90% non-condensing.	
xxii	Should be plenum rated and comply to RoHS	
xxiii	Should be Wi-Fi certified and WPC approved.	
xxiv	Mechanism for physical device locking using padlock /Kensington lock / equivalent	
xxv	Warranty for Three Years should be quoted with TAC Support	
xxvi	Attach product Data Sheet/Supporting documents of the OEM to show compliances to the specifications given above.	
xxvii	The access point should be IoT-ready supporting Bluetooth 5 and Zigbee radios (internal or external) to support advanced location-based services for Mobile engagement solutions and Applications.	
xxviii	The access point should support Intelligent Power Monitoring (IPM) capability to continuously monitor and report hardware energy consumption.	
xxix	AP should support Standalone mode / Cloud Mode or Inbuilt Virtual controller mode for specific deployment requirements	

xxx	AP should support Pass point Wi-Fi (Hotspot 2.0) offering seamless cellular-to-Wi-Fi carryover for guests	
xxxi	OEM shall be present in Leader's quadrant consistently in the latest Gartner's Magic Quadrant for Wired and Wireless LAN Access Infrastructure for the last five years.	
xxxii	Manufacturers Authorization Letter Specific to this tender must be submitted. Tenders submitted without MAF will be rejected.	
xxxiii	The access point should have a console port for local management	
xxxiv	APs shall be offered with a limited lifetime hardware warranty (up to 5 years from EOS) with Next Business Day shipment, 8x5 business hours technical support, and access to all generally available software/OS releases	

Specification for Passive Work

Sl No	Required Makes	Description	Qty	Make Offered by the Bidder from among the 03 specified in "Required Makes' column
1	Molex/Penduit/CommScope	Cat6A Information Outlet	198	
2	Molex/Penduit/CommScope	Cat6A Unloaded Jackpanel	9	
3	Molex/Penduit/CommScope	Cat6A UTP Patch Cord - 1 Meter	198	
4	Molex/Penduit/CommScope	Cat6A UTP Patch Cord - 2 Meter	198	
5	Molex/Penduit/CommScope	6 Core Optical Fibre Cable -SM (Meter)	1000	
6	Molex/Penduit/CommScope	12 Port SC Loaded LIU - MM	1	
7	Molex/Penduit/CommScope	6 Port SC Loaded LIU - MM	2	
8	Molex/Penduit/CommScope	LC-LC Optical Fibre Patch Cord MM - 3 Meter	8	
9	Molex/Penduit/CommScope	SC-LC Optical Fibre Patch Cord SM - 3 Meter	9	
10	Dynamic	42U Network Rack Loaded	1	
11	Standard	Cable Manager	8	
12	Standard (ISI Mark)	40mm HDPE Pipe	800	
13	Service	Digging of the Hard Soil	800	
14	Service	Termination of the Information Outlet	198	
15	Service	Installation of the Jack Panel	9	
16	Service	Installation of the LIU	2	
17	Service	Laying of the Optical Fibre Cable	1000	
18	Service	Splicing of the OFC Core	54	
19	Service	Installation of the 42U Network Rack	1	
20	Service	Labeling & Dressing of the Patch Cord	396	

Price Bid 'A'

Sr. No	Product	Qty	Unit Price	Amount	Tax	Amount with Tax
1	Core Switch	02				
1	24 port POE Switch	03				
2	48 Port Layer-2 Switch	05				
3	Access Points	20				
	Total					

Price Bid 'B'

SN	Make offered by bidder	Description	Qty	Unit price	Amount	Tax	Amount with tax
1		Cat6A Information Outlet	198				
2		Cat6A Unloaded Jackpanel	9				
3		Cat6A UTP Patch Cord - 1 Meter	198				
4		Cat6A UTP Patch Cord - 2 Meter	198				
5		6 Core Optical Fibre Cable -SM (Meter)	1000				
6		12 Port SC Loaded LIU - MM	1				
7		6 Port SC Loaded LIU - MM	2				
8		LC-LC Optical Fibre Patch Cord MM - 3 Meter	8				
9		SC-LC Optical Fibre Patch Cord SM - 3 Meter	9				
10		42U Network Rack Loaded	1				
11		Cable Manager	8				
12		40mm HDPE Pipe	800				
13		Digging of the Hard Soil	800				
14		Termination of the Information Outlet	198				
15		Installation of the Jack Panel	9				
16		Installation of the LIU	2				
17		Laying of the Optical Fibre Cable	1000				
18		Splicing of the OFC Core	54				
19		Installation of the 42U Network Rack	1				
20		Labeling & Dressing of the Patch Cord	396				
		Total					

Final Amount

Amount A	Amount B	Total (A+B)